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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/761,835	01/20/2004	Jong-Kon Choi	9903-086	4066
20575 7590 01/25/2007 MARGER JOHNSON & MCCOLLOM, P.C. 210 SW MORRISON STREET, SUITE 400 PORTLAND, OR 97204			EXAMINER MITCHELL, JAMES M	
			ART UNIT	PAPER NUMBER
			2813	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/25/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/761,835

Applicant(s)

CHOI, JONG-KON

Examiner

James M. Mitchell

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 October 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-5 and 12-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 12-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

This office action is in response to applicant's after final remarks amendment filed October 5, 2006. Because applicant's remarks on pages 6 and 7, filed October 5, 2006 with respect to the combination of Fisher and Mullen were persuasive, the basis of that prior rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection based on the same art has been made.

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-5 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. There is no support in applicant's original disclosure for a metallic layer attached to a back of a chip without an intervening adhesive layer.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3, 4, 12-14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fisher (U.S. 5,936,758) in combination with Yamamoto et al. (U.S. 4,554,573).

Fisher (Fig 1) discloses:

(cl. 1, 12, 14) a digital micro-mirror device (14; Col. 5, Lines 45-48) package, comprising: a base substrate (46) having a top surface and a bottom surface; an adhesive disposed on the top surface of the base substrate; a semiconductor chip (12) over the adhesive, and electrically connected (24) with the base substrate; one or more mirrors (14; Col. 5, Lines 45-48) mounted on the semiconductor chip; a hermetic sealing means (Abstract) covering the semiconductor chip including the one or more mirrors; (cl. 13) with the board ceramic (Col. 5, Lines 65-66);

Fisher does not show a low melting point, Al, metallic layer without an intervening adhesive/ or formed directly on a back surface of a chip, with the chip attached to the top surface of a substrate with an metallic adhesive.

Yamamoto (Fig. 2-3) utilizes aluminum and therefore a low melting, metallic layer (5) formed without an intervening adhesive layer "e.g. evaporated" method) or directly on a back of a chip with the chip attached to the top surface of a substrate with an adhesive (2).

It would have been obvious to one of ordinary skill in the art to modify the package of Fisher by incorporating a metallic layer in a manner taught by Fisher that is

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between the chip and adhesive in order to eliminate destruction of device due to stress as taught by Yamamoto (Abstract).

Claims 2 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fisher (U.S. 5,936,758) and Yamamoto et al. (U.S. 4,554,573) as applied to claim 12 and further in combination with Akram (U.S. 2001/004564).

Neither Fisher nor Yamamoto utilizes a heat sink attached on the bottom surface of the base substrate.

Akram (Fig. 10) utilizes a heat sink (340) attached on the bottom surface of the base substrate.

It would have been obvious to one of ordinary skill in the art to incorporate a heat sink attached on the bottom surface of the base substrate of the modified structure including Fisher in order to provide heat management as taught by Akram (Col. 7, Lines 57-60).

Claims 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fisher (U.S. 5,936,758) and Yamamoto et al. (U.S. 4,554,573) as applied to claim 1, and further Zhao (U.S. 6,882,042).

Neither Fisher nor Yamamoto appears to disclose a metallic, low melting point solder adhesive that's solid at room temperature.

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However, Zhao teaches a metallic, low melting point<sup>1</sup> solder adhesive (Col. 7, Lines 16-17) that solid at room temperature.

Since Zhao evidences solder as a known adhesive means, it would have been obvious to one of ordinary skill in the art to form the adhesive taught by Yamamoto with the solder of Zhao as an alternative means to provide an adhesive for attaching a chip to a substrate. Furthermore the material would have been obvious to one of ordinary skill in the art, since it has been held that the selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See M.P.E.P 2144.07.

Claims 12-14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fisher (U.S 5,936,758) in combination with Mullen (U.S. 5,241,133).

(cl. 12, 14) a digital micro-mirror device (14; Col. 5, Lines 45-48) package, comprising: a base substrate (46) having a top surface and a bottom surface; an adhesive disposed on the top surface of the base substrate; a semiconductor chip (12) over the adhesive, and electrically connected (24) with the base substrate; one or more mirrors (14; Col. 5, Lines 45-48) mounted on the semiconductor chip; a hermetic sealing means (Abstract) covering the semiconductor chip including the one more mirrors;

(cl. 13) with the board ceramic (Col. 5, Lines 65-66);

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<sup>1</sup> Same material claimed by applicant.

Fisher does not show a copper, low melting point, metallic layer formed directly on a back surface of a chip, with the chip attached to the top surface of a substrate with a metallic adhesive.

Mullen (Fig 6) utilizes a copper and therefore a low melting point, metallic layer (60) on a back of a chip (through adhesive 67) with the chip attached to the top surface of a substrate with an adhesive.

It would have been obvious to one of ordinary skill in the art to modify the package of Fisher by incorporating a copper metallic layer between the chip and adhesive in order to reduce stress and replace high cost ceramic substrates with plastic as taught by Mullen (Col. 2, Lines 28-30 & Col. 4, Lines 41-42).

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fisher (U.S 5,936,758) and Mullen (U.S. 5,241,133) as applied to claim 12 and further in combination with Akram (U.S. 2001/004564).

Neither Fisher nor Mullen utilize a heat sink attached on the bottom surface of the base substrate.

Akram (Fig. 10) utilizes a heat sink (340) attached on the bottom surface of the base substrate.

It would have been obvious to one of ordinary skill in the art to incorporate a heat sink attached on the bottom surface of the base substrate of the modified structure including Fisher in order to provide heat management as taught by Akram (Col. 7, Lines 57-60).

### ***Response to Arguments***

Except for claims 12-16, applicant's arguments with respect to claims 1-5 have been considered, but are not persuasive.

In an effort to expedite prosecution of the application, examiner has addressed arguments that may still be relevant.

Applicant contends that his specification including his written description (Page 6, Lines 29 to page 7) provides support for a metal layer formed on the back of a chip without an intervening layer. However, examiner respectfully disagrees.

As indicated in applicant's remarks, support does not have to be literal, but must be found expressly, implicitly or inherently. However, nothing in applicant's specification or alleged analysis would enable one skilled in the art with reasonable clarity that applicant was in possession of a "metallic layer on a back surface of a chip without an intervening layer therebetween." Rather the only reference to an adhesive in context with claimed invention's metallic layer is found on page 7 of applicant's specification that says, "[w]ith respect to the adhesive means and the temperature in the chip layer 115." Indeed the structure and grammar in the paragraph seems to suggest that something else will follow to clarify the adhesive means, but nothing does. Moreover, even though the phrase and context in the sentence seems confusing, it can be argued if nothing else that it suggests that there is an intervening adhesive as denoted by the phrase "adhesive means."

Lastly, with respect to the distinction of "on" and "directly on," after careful consideration, examiner agrees with applicant that there may be a distinction if the



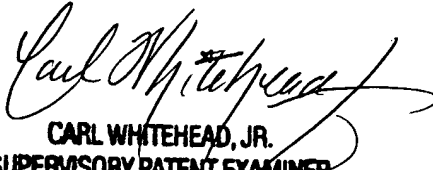
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intervening material was not an adhesive. However, where the intervening material is an adhesive material in between the chip and substrate, a chip that is directly on (as phrased by applicant) the adhesive material is also directly on/mechanically connected to the substrate. To one of ordinary skill in the art, use of intervening adhesive on an item is not the type layer that would be excluded by the limitation directly on. See for example cited art, Ho et al. (U.S. 6,369,455), that discloses chip in direct contact with heat sink though an adhesive.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James M. Mitchell whose telephone number is (571) 272-1931. The examiner can normally be reached on M-F 8:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

  
CARL WHITEHEAD, JR.  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Ex. Mitchell, J.D.  
January 19, 2007